

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln. No. : 10/562,511 Confirmation No.: 7969
Appellant : BERND CLAUBERG
Filed : DECEMBER 28, 2005
TC/A.U. : 2821
Examiner : ALEMU, E.

Docket No. : US030201
Title : SINGLE LED DRIVER FOR A TRAFFIC LIGHT

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Dear Sir:

Please consider Appellant's brief as follows:

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1. REAL PARTY IN INTEREST

The real party in interest is the assignee of record U.S. Philips Corporation, a Delaware corporation having an office and a place of business at 1251 Avenue of the Americas, New York, New York 10020-1104.

2. RELATED APPEALS AND INTERFERENCES

Appellant and the undersigned attorneys are not aware of any appeals, judicial proceedings, or any interferences which may be related to, directly affect or be directly affected by, or have a bearing on the Board's decision in the pending appeal.

3. STATUS OF CLAIMS

Claims 1, 3-6, and 8-10 are pending. Claims 2 and 7 were cancelled.

Claims 1 and 3-5 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,809,655 to Colby (the *Colby* patent) in view of U.S. Patent No. 6,362,578 to Swanson, *et al.* (the *Swanson* patent).

Claims 6 and 8-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,809,655 to Colby (the *Colby* patent) in view of U.S. Patent Publication No. 2002/0175826 to Hutchison, *et al.* (the *Hutchison* publication).

Claims 1, 3-6, and 8-10 are the claims on appeal. *See* Claims Appendix.

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4. STATUS OF AMENDMENTS

No amendments to the claims were filed subsequent to the Final Rejection mailed on July 8, 2008.

5. SUMMARY OF CLAIMED SUBJECT MATTER

In this Summary of Claimed Subject Matter, all citations are to the specification of United States Patent Application 10/562,511. All citations are illustrative only and additional support for the cited element may be found elsewhere in the specification. *See FIGS. 1-6; page 1, line 1, through page 4, line 33.*

Independent Claim 1:

A traffic light (10, 11), comprising: a voltage source (V_S); a first LED circuit including a series connection of a first LED array (30), a first current limiter (31) and a first electronic switch (32) to said voltage source (V_S); a second LED circuit connected in parallel to said first LED circuit, said second LED circuit including a series connection of a second LED array (40), a second current limiter (41) and a second electronic switch (42) to said voltage source (V_S); and a switch controller (21) operable to selectively open and close said first electronic switch (32). *See FIGS. 1-3; page 2, line 16, through page 3, line 23.*

Said first current limiter (31) controls a flow of a first LED current (I_{RL}) from said voltage source (V_S) through said first LED array (30) whenever said switch controller (21) closes said first electronic switch (32). The flow of the first LED current (I_{RL}) from said voltage source (V_S) through said first LED array (30) is impeded whenever said switch controller (21) opens said first electronic switch (32). *See page 2, lines 23-24; page 3, lines 10-12.*

Said switch controller (21) is further operable to selectively open and close said second electronic switch (42). Said second current limiter (41) controls a flow of a second LED current (I_{YL}) from said voltage source (V_S) through said second LED array (40) whenever said switch controller (21) closes said second electronic switch (42). The flow of the second LED current (I_{YL}) from said voltage source (V_S) through said second LED array (40) is impeded whenever said switch controller (21) opens said second electronic switch (42). *See page 2, lines 29-30; page 3, lines 13-15.*

Said switch controller (21) is further operable to prevent simultaneous closure of said first electronic switch (32) and said second electronic switch (42). *See page 3, lines 19-23.*

Independent Claim 6:

A traffic light (60, 61), comprising: a current source (I_S); a first LED circuit connected in series to said current source (I_S), said first LED circuit including a parallel connection of a first LED array (80) and a first electronic switch (81); a second LED circuit connected in series to said first LED circuit, said second LED circuit including a parallel connection of a second LED array (90) and a second electronic switch (91); and a switch controller (71) operable to selectively open and close said first electronic switch (81). *See FIGS. 4-6; page 3, line 24, through page 4, line 33. See FIGS. 4-6; page 3, line 24-28.*

A first LED current (I_{RL}) flows from said current source (I_S) through said first LED array (80) whenever said switch controller (71) opens said first electronic switch (81). The flow of the first LED current (I_{RL}) from said current source (I_S) through said first LED array (80) is impeded whenever said switch controller (71) closes said first electronic switch (81). *See page 3, lines 29-30; page 4, lines 14-18.*

Said switch controller (71) is further operable to selectively open and close said second electronic switch (91). A second LED current (I_{YL}) flows from said current source (I_S) through said second LED array (90) whenever said switch controller (71) opens said second electronic switch (91). The flow of the second LED current (I_{YL}) from said current source (I_S) through said second LED array (90) is impeded whenever said switch controller (71) closes said second electronic switch (91). *See page 3, lines 34-35; page 4, lines 19-23.*

Said switch controller (71) is further operable to prevent simultaneous opening of said first electronic switch (81) and said second electronic switch (91). *See page 4, lines 29-33.*

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1 and 3-5 are unpatentable over U.S. Patent No. 6,809,655 to Colby (the *Colby* patent) in view of U.S. Patent No. 6,362,578 to Swanson, *et al.* (the *Swanson* patent) under 35 U.S.C. §103(a).

Whether claims 6 and 8-10 are unpatentable over U.S. Patent No. 6,809,655 to Colby (the *Colby* patent) in view of U.S. Patent Publication No. 2002/0175826 to Hutchison, *et al.* (the *Hutchison* publication) under 35 U.S.C. §103(a).

7. ARGUMENTS

The Appellant respectfully submits that claims 1 and 3-5 are allowable over U.S. Patent No. 6,809,655 to Colby (the *Colby* patent) in view of U.S. Patent No. 6,362,578 to Swanson, *et al.* (the *Swanson* patent) under 35 U.S.C. §103(a), and that the rejection of claims 1 and 3-5 should be reversed.

Further, the Appellant respectfully submits that claims 6 and 8-10 are allowable over U.S. Patent No. 6,809,655 to Colby (the *Colby* patent) in view of U.S. Patent Publication No. 2002/0175826 to Hutchison, *et al.* (the *Hutchison* publication) under 35 U.S.C. §103(a), and that the rejection of claims 6 and 8-10 should be reversed.

I. Claims 1 and 3-5 are patentable over the *Colby* patent in view of the *Swanson* patent under 35 U.S.C. §103(a).

Obviousness is a question of law, based on the factual inquiries of 1) determining the scope and content of the prior art; 2) ascertaining the differences between the claimed invention and the prior art; and 3) resolving the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). See MPEP 2143.03.

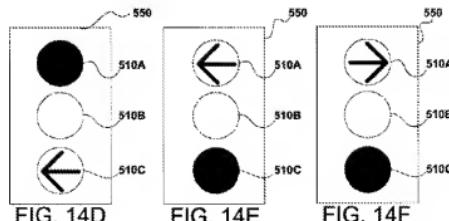
A. The *Colby* patent and the *Swanson* patent fail to show a traffic light wherein the switch controller is operable to prevent simultaneous closure of the first electronic switch and the second electronic switch as claimed.

Claims 1 and 3-5 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,809,655 to Colby (the *Colby* patent) in view of U.S. Patent No. 6,362,578 to Swanson, *et al.* (the *Swanson* patent). The Appellant respectfully asserts that the *Colby* patent and the *Swanson* patent, alone or in combination, fail to teach or suggest all the claim limitations of the rejected claims. The *Colby* patent and the

Swanson patent fails to disclose, teach, or suggest a traffic light wherein said switch controller (21) is further operable to prevent simultaneous closure of said first electronic switch (32) and said second electronic switch (42), as recited in independent claim 1.

On page 6 of the Office Action dated July 8, 2008, the Examiner asserted that the single control module including electronics operable to prevent simultaneous closure of the electronic switches associated with the LED circuits would have been obvious for no other reason than displaying distinguishable illuminated signals to control the direction and flow of traffic at an intersection. The Appellant respectfully disagrees. The *Colby* patent explicitly teaches simultaneous illumination of multiple lamps, which teaches away from preventing simultaneous closure of electronic switches as claimed.

The *Colby* patent discloses simultaneous illumination of multiple lamps, which requires simultaneous actuation (closing or opening) of electronic switches. In one embodiment, during a period of peak traffic volume, a pattern of a red left turn arrow 310 is displayed while at the same time another lamp 510 in the same traffic signal 550 displays a green up arrow. See column 9, lines 4-8. Figures 14C through 14I show simultaneous illumination of red lamp 510A and green lamp 510C, as shown below for Figures 14D through 14F. See Figures 14C-14I; column 3, lines 13-34; column 9, lines 13-43.



Thus, the *Colby* patent requires simultaneous closure of electronic switches, rather than preventing simultaneous closure as claimed, and teaches away from the present invention.

On page 2 of the Advisory Action mailed October 3, 2008, the Examiner asserted that the *Colby* patent discloses a known separately controlled traffic light as illustrated in Fig. 4a, which reads on operable to prevent simultaneous opening of electronic switches. The Appellant respectfully disagrees. Figures 4A-4C of the *Colby* patent shows relative positions and patterns of the lamps in a traffic signal, and the specification describes the color and pattern of the lamps, but the *Colby* patent fails to disclose that any of the lamps as illustrated are illuminated. In the figures, lamp 110, not showing a specific pattern, are meant to illustrate a default filled circle pattern. Advanced traffic signal 420 includes a yellow lamp 450 with arrow pattern 310 used for direction control. *See* Figures 4A-4C; column 1, lines 43-52. Thus, the *Colby* patent fails to disclose preventing simultaneous closure as claimed.

On page 6 of the Office Action dated July 8, 2008, the Examiner noted that the present Application requires only a properly working switch controller for prevention of simultaneous closure of electronic switches. This points out one aspect of the Appellant's invention and further supports allowance of the present Application.

B. The *Colby* patent fails to show a traffic light controlled by a single control module as asserted by the Examiner.

The Appellant also respectfully disagrees with the Examiner's assertion on page 2, section 3, of the Office Action dated July 8, 2008, that the *Colby* patent discloses first to fifth LED circuits selectively controlled by a single control module. At most, the prior art discussed by the *Colby* patent discloses traffic signals with various numbers and configurations of lamps, but is silent as to the lamps being controlled by a single control module. In a typical installation, several traffic signals are supported by one or more supporting elements and coupled through a single control module including electronics. *See* Figure 4B; column 1, line 43 through

column 2, line 4. Thus, the *Colby* patent discloses several traffic signals, not LED circuits, coupled through a single control module.

C. Modification of the *Swanson* patent to prevent simultaneous switch closure as claimed makes the automobile rear combination lamp driver circuit of the *Swanson* patent inoperable and defeats its purpose.

The Examiner asserted on page 3 of the Office Action dated July 8, 2008, that the *Swanson* patent discloses and teaches to provide a switch controller (i.e., PWM 38) operable to selectively open and close the first to third electronic switches (24, 26, 28). As noted by the Examiner on page 4 of the Office Action dated March 17, 2008, the *Swanson* patent does not mention that the switch controller is operable to prevent simultaneous closure of the first to third electronic switches. The Appellant respectfully suggests that modifying the automobile rear combination lamp driver circuit of the *Swanson* patent to prevent simultaneous closure makes the automobile rear combination lamp driver circuit of the *Swanson* patent inoperable and defeats its purpose.

The *Swanson* patent discloses a plurality of arrays 14, 16 and 18 of light emitting diodes, such as the turn, stop and tail LED's, positioned at the rear portion 20 of an automobile. The drive circuit 10 includes the arrays 14, 16, 18 of light emitting diodes 22 and a respective transistor 24, 26, 28. A PWM controller 38 has an output 38b connected to selected transistors for driving selected transistors 26, 28. *See* Figure 1; column 2, line 59 through column 3, line 22.

The modification to prevent simultaneous switch closure makes the automobile rear combination lamp driver circuit of the *Swanson* patent inoperable: preventing simultaneous closure of the first and second electronic switches would prevent simultaneous operation of two of the LED arrays. For example, when the transistor 28 was closed to light the tail LEDs, the turn and stop LEDs would be disabled if simultaneous closure were prevented. This would be unsafe and render the automobile rear combination lamp driver circuit inoperable. The modification defeats

the purpose of the automobile rear combination lamp driver circuit in reducing the time to light the brake lamp, since the break lamp would be disabled. *See* column 1, lines 11-19.

D. The *Swanson* patent is in a different art area than the Appellant's invention, contrary to the assertion of the Examiner.

The Examiner asserted on page 4 of the Office Action dated July 8, 2008, that the *Swanson* patent is in an art area related to the Appellant's invention. The Appellant respectfully disagrees. The *Swanson* patent is in the art area of driver circuits for LEDs used in the rear combination lights of automobiles, not traffic lights of the Appellant's invention. *See* Figure 1; column 1, lines 4-32; column 2, lines 59-64.

E. The *Colby* patent and the *Swanson* patent fail to show a traffic light wherein the switch controller is operable to prevent simultaneous closure of the first electronic switch, second electronic switch, third electronic switch, fourth electronic switch, and/or fifth electronic switch as claimed.

Claims 3-5 depend directly or indirectly from independent claim 1. Therefore, the dependent claims include all the elements and limitations of independent claim 1. The Appellant respectfully submits that dependent claims 3-5 are allowable over the *Colby* patent in view of the *Swanson* patent for at least the same reasons as set forth above with respect to independent claim 1.

The Appellant also submits that the *Colby* patent and the *Swanson* patent fail to disclose, teach, or suggest a traffic light: wherein said switch controller (21) is further operable to prevent simultaneous closure of said second electronic switch (42) and said third electronic switch (52) as recited in dependent claim 3; wherein said switch controller (21) is further operable to prevent simultaneous closure of said third electronic switch (52) and said fourth electronic switch (46) as recited in dependent claim 4; or wherein said switch controller (21) is further operable to prevent

simultaneous closure of said fourth electronic switch (46) and said fifth electronic switch (56) as recited in dependent claim 5.

Reversal of the rejection of claims 1 and 3-5 under 35 U.S.C. §103(a) as being unpatentable over the *Colby* patent in view of the *Swanson* patent is respectfully requested.

II. Claims 6 and 8-10 are patentable over the *Colby* patent in view of the *Hutchinson* publication under 35 U.S.C. §103(a).

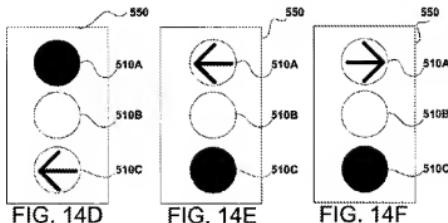
Obviousness is a question of law, based on the factual inquiries of 1) determining the scope and content of the prior art; 2) ascertaining the differences between the claimed invention and the prior art; and 3) resolving the level of ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966). To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). See MPEP 2143.03.

A. The *Colby* patent and the *Hutchinson* publication fail to show a traffic light wherein the switch controller is operable to prevent simultaneous opening of the first electronic switch and the second electronic switch as claimed.

Claims 6 and 8-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,809,655 to Colby (the *Colby* patent) in view of U.S. Patent Publication No. 2002/0175826 to Hutchison, *et al.* (the *Hutchison* publication). The Appellant respectfully asserts that the *Colby* patent and the *Hutchinson* publication, alone or in combination, fail to teach or suggest all the claim limitations of the rejected claims. The *Colby* patent and the *Hutchinson* publication fail to disclose, teach, or suggest a traffic light wherlein said switch controller (71) is further operable to prevent simultaneous opening of said first electronic switch (81) and said second electronic switch (91), as recited in independent claim 6.

On page 6 of the Office Action dated July 8, 2008, the Examiner asserted that the single control module including electronics operable to prevent simultaneous closure of the electronic switches associated with the LED circuits would have been obvious for no other reason than displaying distinguishable illuminated signals to control the direction and flow of traffic at an intersection. The Appellant respectfully disagrees. The *Colby* patent explicitly teaches simultaneous illumination of multiple lamps, which teaches away from preventing simultaneous opening of electronic switches as claimed.

The *Colby* patent discloses simultaneous illumination of multiple lamps, which requires simultaneous actuation (closing or opening) of electronic switches. In one embodiment, during a period of peak traffic volume, a pattern of a red left turn arrow 310 is displayed while at the same time another lamp 510 in the same traffic signal 550 displays a green up arrow. *See* column 9, lines 4-8. Figures 14C through 14I show simultaneous illumination of red lamp 510A and green lamp 510C, as shown below for Figures 14D through 14F. *See* Figures 14C-14I; column 3, lines 13-34; column 9, lines 13-43.



Thus, the *Colby* patent requires simultaneous actuation (closing or opening) of electronic switches, rather than preventing simultaneous opening as claimed, and teaches away from the present invention.

On page 2 of the Advisory Action mailed October 3, 2008, the Examiner asserted that the *Colby* patent discloses a known separately controlled traffic light as

illustrated in Fig. 4a, which reads on operable to prevent simultaneous opening of electronic switches. The Appellant respectfully disagrees. Figures 4A-4C of the *Colby* patent shows relative positions and patterns of the lamps in a traffic signal, and the specification describes the color and pattern of the lamps, but the *Colby* patent fails to disclose that any of the lamps as illustrated are illuminated. In the figures, lamp 110, not showing a specific pattern, are meant to illustrate a default filled circle pattern. Advanced traffic signal 420 includes a yellow lamp 450 with arrow pattern 310 used for direction control. *See* Figures 4A-4C; column 1, lines 43-52. Thus, the *Colby* patent fails to disclose preventing simultaneous closure as claimed.

On page 6 of the Office Action dated July 8, 2008, the Examiner noted that the present Application requires only a properly working switch controller for prevention of simultaneous closure of electronic switches. This points out one aspect of the Appellant's invention and further supports allowance of the present Application.

B. The *Colby* patent fails to show a traffic light controlled by a single control module as asserted by the Examiner.

The Appellant also respectfully disagrees with the Examiner's assertion on page 2, section 3, of the Office Action dated July 8, 2008, that the *Colby* patent discloses first to fifth LED circuits selectively controlled by a single control module. At most, the prior art discussed by the *Colby* patent discloses traffic signals with various numbers and configurations of lamps, but is silent as to the lamps being controlled by a single control module. In a typical installation, several traffic signals are supported by one or more supporting elements and coupled through a single control module including electronics. *See* Figure 4B; column 1, line 43 through column 2, line 4. Thus, the *Colby* patent discloses several traffic signals, not LED circuits, coupled through a single control module.

C. Modification of the *Hutchison* publication to prevent simultaneous switch opening as claimed makes the traffic light of the *Hutchison* publication

inoperable and defeats its purpose. The *Hutchison* publication also teaches away from such modification.

The Examiner asserted on page 5 of the Office Action dated July 8, 2008, that the *Hutchison* publication discloses a switch controller (64) operable to selectively open and close each of the first, second and third electronic switches (Q9, Q8, Q15). As noted by the Examiner on page 6 of the Office Action dated March 17, 2008, the *Hutchison* publication does not mention being operable to prevent simultaneous opening of the first, second, and third electronic switches. The Appellant respectfully suggests that modifying the traffic light of the *Hutchison* publication to prevent simultaneous opening makes the traffic light of the *Hutchison* publication inoperable and defeats its purpose.

The *Hutchison* publication discloses a reconfigurable LED array having a plurality of LED sets, each LED set adapted to be enabled for a different DC operating voltage. The LED array is configured as four sets of LEDs, one main array and three additional LED arrays. At a lower most specified operating DC voltage, such as 35 volts, only the main LED array is PWM driven. However, as the operating voltage increases to 48 volts, the other three LED arrays are selectively driven to increase light output as the operating voltage increases. In a normal mode of operation, such as at a nominal 48 volts, all LED sets are driven. *See* paragraphs [0006], [0007].

The modification to prevent simultaneous switch opening makes the traffic light of the *Hutchison* publication inoperable: preventing simultaneous opening of the first, second, and third electronic switches would prevent the traffic light from selectively driving the three additional LED arrays so that the three additional LED arrays are energized in increasing numbers with increasing voltage. *See* the table of paragraph [0018]. The modification defeats the purpose of the traffic light of the *Hutchison* publication because the series of LEDs would not be selectively enabled, such that one, two, three or all four of the LED sets can be enabled and pulsed with modulated to achieve a desired light output, even as the DC voltage degrades from a

pre-determined specified level, such as 48 volts, all the way down to roughly 29 volts.
See the table of paragraph [0008].

The *Hutchison* publication also teaches away from such modification. In a normal mode of operation, such as at a nominal 48 volts, all LED sets are driven. *See* paragraph [0007]. Therefore, the *Hutchison* publication teaches that all LED sets are driven together, not that opening of one switch should prevent simultaneous opening of any other switch, and teaches away from preventing simultaneous opening of said first electronic switch and said second electronic switch as recited in independent claim 6.

D. The *Colby* patent and the *Hutchinson* publication fail to show a traffic light wherein the switch controller is operable to prevent simultaneous opening of the first electronic switch, second electronic switch, third electronic switch, fourth electronic switch, and/or fifth electronic switch as claimed.

Claims 8-10 depend directly or indirectly from independent claim 6. Therefore, the dependent claims include all the elements and limitations of independent claim 6. The Appellant respectfully submits that dependent claims 8-10 are allowable over the *Colby* patent in view of the *Hutchinson* publication for at least the same reasons as set forth above with respect to independent claim 6.

The Appellant also submits that the *Colby* patent and the *Hutchinson* publication fail to disclose, teach, or suggest a traffic light: wherein said switch controller (71) is further operable to prevent simultaneous opening of said second electronic switch (91) and said third electronic switch (101) as recited in dependent claim 8; wherein said switch controller (71) is further operable to prevent simultaneous opening of said third electronic switch (101) and said fourth electronic switch (94) as recited in dependent claim 9; or wherein said switch controller (71) is further operable to prevent simultaneous opening of said fourth electronic switch (94) and said fifth electronic switch (104) as recited in dependent claim 10.

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Reversal of the rejection of claims 6 and 8-10 under 35 U.S.C. §103(a) as being unpatentable over the *Colby* patent in view of the *Hutchinson* publication is respectfully requested.

8. SUMMARY

The Appellant respectfully submits that claims 1, 3-6, and 8-10 fully satisfy the requirements of 35 U.S.C. §103. In view of the foregoing, reversal of the rejection of claims 1, 3-6, and 8-10 is respectfully requested.

Dated: November 26, 2008

Respectfully submitted,
BERND CLAUBERG

PHILIPS INTELLECTUAL
PROPERTY & STANDARDS
P.O. Box 3001
Briarcliff Manor, New York 10510

Eric M. Bram
Registration No. 37,285
Attorney for Appellant

CARDINAL LAW GROUP
Suite 2000
1603 Orrington Avenue
Evanston, Illinois 60201
Phone: (847) 905-7111
Fax: (847) 905-7113

/FRANK C. NICHOLAS/
Frank C. Nicholas
Registration No. 33,983
Attorney for Appellant

9. CLAIMS APPENDIX

1. (Previously presented) A traffic light (10, 11), comprising:
 - a voltage source (V_S);
 - a first LED circuit including a series connection of a first LED array (30), a first current limiter (31) and a first electronic switch (32) to said voltage source (V_S);
 - a second LED circuit connected in parallel to said first LED circuit, said second LED circuit including a series connection of a second LED array (40), a second current limiter (41) and a second electronic switch (42) to said voltage source (V_S); and
 - a switch controller (21) operable to selectively open and close said first electronic switch (32),
 - wherein said first current limiter (31) controls a flow of a first LED current (I_{RL}) from said voltage source (V_S) through said first LED array (30) whenever said switch controller (21) closes said first electronic switch (32),
 - wherein the flow of the first LED current (I_{RL}) from said voltage source (V_S) through said first LED array (30) is impeded whenever said switch controller (21) opens said first electronic switch (32),
 - wherein said switch controller (21) is further operable to selectively open and close said second electronic switch (42),
 - wherein said second current limiter (41) controls a flow of a second LED current (I_{YL}) from said voltage source (V_S) through said second LED array (40) whenever said switch controller (21) closes said second electronic switch (42),
 - wherein the flow of the second LED current (I_{YL}) from said voltage source (V_S) through said second LED array (40) is impeded whenever said switch controller (21) opens said second electronic switch (42), and
 - wherein said switch controller (21) is further operable to prevent simultaneous closure of said first electronic switch (32) and said second electronic switch (42).

2. (Cancelled)

3. (Previously presented) The traffic light (10, 11) of claim 1,
further comprising:

a third LED circuit connected in parallel to said first LED circuit and
said second LED circuit, said third LED circuit including a series connection of a
third LED array (50), a third current limiter (51) and a third electronic switch (52) to
said voltage source (V_S),

wherein said switch controller (21) is further operable to selectively
open and close said third electronic switch (52),

wherein said third current limiter (51) controls a flow of a third LED
current (I_{GL}) from said voltage source (V_S) through said third LED array (50)
whenever said switch controller (21) closes said third electronic switch (52),

wherein the flow of the third LED current (I_{GL}) from said voltage
source (V_S) through said third LED array (50) is impeded whenever said switch
controller (21) opens said third electronic switch (52), and

wherein said switch controller (21) is further operable to prevent
simultaneous closure of said second electronic switch (42) and said third electronic
switch (52).

4. (Previously presented) The traffic light (10, 11) of claim 3,
further comprising:

a fourth LED circuit connected in parallel to said first LED circuit, said
second LED circuit and said third LED circuit, said fourth LED circuit including a
series connection of a fourth LED array (44), a fourth current limiter (45) and a fourth
electronic switch (46) to said voltage source (V_S),

wherein said switch controller (21) is further operable to selectively
open and close said fourth electronic switch (46),

wherein said fourth current limiter (45) controls a flow of a fourth LED current from said voltage source (V_S) through said fourth LED array (44) whenever said switch controller (21) closes said fourth electronic switch (46),

wherein the flow of the fourth LED current from said voltage source (V_S) through said fourth LED array (44) is impeded whenever said switch controller (21) opens said fourth electronic switch (46), and

wherein said switch controller (21) is further operable to prevent simultaneous closure of said third electronic switch (52) and said fourth electronic switch (46).

5. (Previously presented) The traffic light (10, 11) of claim 4, further comprising:

a fifth LED circuit connected in parallel to said first LED circuit, said second LED circuit, said third LED circuit and said fourth LED circuit, said fifth LED circuit including a series connection of a fifth LED array (54), a fifth current limiter (55) and a fifth electronic switch (56) to said voltage source (V_S),

wherein said switch controller (21) is further operable to selectively open and close said fifth electronic switch (56),

wherein said fifth current limiter (55) controls a flow of a fifth LED current from said voltage source (V_S) through said fifth LED array (54) whenever said switch controller (21) closes said fifth electronic switch (56),

wherein the flow of the fifth LED current from said voltage source (V_S) through said fifth LED array (54) is impeded whenever said switch controller (21) opens said fifth electronic switch (56), and

wherein said switch controller (21) is further operable to prevent simultaneous closure of said fourth electronic switch (46) and said fifth electronic switch (56).

6. (Previously presented) A traffic light (60, 61), comprising:
a current source (I_S);

a first LED circuit connected in series to said current source (I_S), said first LED circuit including a parallel connection of a first LED array (80) and a first electronic switch (81);

a second LED circuit connected in series to said first LED circuit, said second LED circuit including a parallel connection of a second LED array (90) and a second electronic switch (91); and

a switch controller (71) operable to selectively open and close said first electronic switch (81),

wherein a first LED current (I_{RL}) flows from said current source (I_S) through said first LED array (80) whenever said switch controller (71) opens said first electronic switch (81), and

wherein the flow of the first LED current (I_{RL}) from said current source (I_S) through said first LED array (80) is impeded whenever said switch controller (71) closes said first electronic switch (81),

wherein said switch controller (71) is further operable to selectively open and close said second electronic switch (91),

wherein a second LED current (I_{YL}) flows from said current source (I_S) through said second LED array (90) whenever said switch controller (71) opens said second electronic switch (91),

wherein the flow of the second LED current (I_{YL}) from said current source (I_S) through said second LED array (90) is impeded whenever said switch controller (71) closes said second electronic switch (91), and

wherein said switch controller (71) is further operable to prevent simultaneous opening of said first electronic switch (81) and said second electronic switch (91).

7. (Cancelled)

8. (Previously presented) The traffic light (60, 61) of claim 6, further comprising:

a third LED circuit connected in series to said second LED circuit, said third LED circuit including a parallel connection of a third LED array (100) and a third electronic switch (101),

wherein said switch controller (71) is further operable to selectively open and close said third electronic switch (101),

wherein a third LED current (I_{GL}) flows from said current source (I_S) through said third LED array (100) whenever said switch controller (71) opens said third electronic switch (101),

wherein the flow of the third LED current (I_{GL}) from said current source (I_S) through said third LED array (100) is impeded whenever said switch controller (71) closes said third electronic switch (101), and

wherein said switch controller (71) is further operable to prevent simultaneous opening of said second electronic switch (91) and said third electronic switch (101).

9. (Previously presented) The traffic light (60, 61) of claim 8, further comprising:

a fourth LED circuit connected in series to said third LED circuit, said fourth LED circuit including a parallel connection of a fourth LED array (93) and a fourth electronic switch (94),

wherein said switch controller (71) is further operable to selectively open and close said fourth electronic switch (94),

wherein a fourth LED current flows from said current source (I_S) through said fourth LED array (93) whenever said switch controller (71) opens said fourth electronic switch (94),

wherein the flow of the fourth LED current from said current source (I_S) through said fourth LED array (93) is impeded whenever said switch controller (71) closes said fourth electronic switch (94), and

wherein said switch controller (71) is further operable to prevent simultaneous opening of said third electronic switch (101) and said fourth electronic switch (94).

10. (Previously presented) The traffic light (60, 61) of claim 9, further comprising:

a fifth LED circuit connected in series to said fourth LED circuit, said fifth LED circuit including a parallel connection of a fifth LED array (103) and a fifth electronic switch (104),

wherein said switch controller (71) is further operable to selectively open and close said fifth electronic switch (104),

wherein a fifth LED current flows from said current source (I_S) through said fifth LED array (103) whenever said switch controller (71) opens said fifth electronic switch (104),

wherein the flow of the fifth LED current from said current source (I_S) through said fifth LED array (103) is impeded whenever said switch controller (71) closes said fifth electronic switch (104), and

wherein said switch controller (71) is further operable to prevent simultaneous opening of said fourth electronic switch (94) and said fifth electronic switch (104).

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10. EVIDENCE APPENDIX

None.

11. RELATED PROCEEDINGS APPENDIX

None.